

## REMARKS

Claims 31-54 remain in this application. Claims 31, 32, 40, 41, 42, 47, 48, and 49 have been amended. New claims 52-54 have been added. No claims have been cancelled. The Applicants respectfully request reconsideration of this application in view of the above amendments and the following remarks.

### Claim Rejections - 35 U.S.C. § 112

(1) The Examiner rejects claims 31-39 under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement.

Independent claim 31 has been amended to overcome the reason for rejection. Applicants respectfully refer the Examiner to page 11, lines 20-22 where it is stated “[t]he *substrate is then moved from the metal deposition chamber **directly** to an annealing chamber*”. Applicants also respectfully refer the Examiner to page 7, line 20 through page 8, line 1, where it is stated “[i]f the annealing is not performed **shortly after the copper has been deposited by either electroplating or chemical vapor deposition (CVD), however, there is unpredictability in the properties of the copper film because of the lapse of time between the metal deposition process and annealing**”. Accordingly, Applicants respectfully submit that the rejection has been overcome.

(2) The Examiner rejects claims 40-46 under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement.

Independent claim 40 has been amended to overcome the reason for rejection. Applicants respectfully refer the Examiner to page 10, lines 7-8 where it is stated “During processing, the wafer is transferred from metal deposition tool 460 **into annealing chamber 432, which is on CMP tool 420 in this embodiment**”. Applicants also

respectfully refer the Examiner to page 10, lines 9-10 where it is stated “*After annealing in annealing chamber 432, the wafer is transferred almost immediately to a CMP platform 422 to undergo the CMP process*”. Accordingly, Applicants respectfully submit that the rejection has been overcome.

(3) The Examiner rejects claims 47-51 under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement.

Independent claim 47 has been amended to overcome the reason for rejection.

### **35 U.S.C. §103(a) Rejection – Henley et al.**

The Examiner has rejected claims 31, 33-41, 43-48 and 50-51 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,207,005 issued to Henley et al. (hereinafter “Henley”). Applicants respectfully submit that the present claims are allowable over Henley.

As amended, independent **claim 31** recites a wafer processing apparatus comprising “*a plurality of chemical vapor deposition chambers, the chemical vapor deposition chambers to deposit metal layers on wafers by chemical vapor deposition; one or more annealing chambers, the one or more annealing chambers integrated with the wafer processing apparatus, the one or more annealing chambers to anneal the metal layers to stabilize hardness of the metal layers prior to chemical mechanical polishing; a robot to move the wafers having the metal layers deposited thereon from the chemical vapor deposition chambers directly to the one or more annealing chambers shortly after the metal layers have been deposited on the wafers*”. Henley does not teach or suggest such a wafer processing apparatus.

Henley discusses cluster tools (see e.g., Figs. 1 and 3). As discussed in Henley, the cluster tools may have various chambers “*selected from at least a CVD chamber, an*

*etch chamber, a PVD chamber, a thermal annealing chamber, a bonding chamber, a CMP chamber, a thermal treatment chamber, a plasma treatment chamber, an epitaxial growth chamber, and others”* (see e.g., column 2, lines 41-45). The cluster tool may include a robot to move wafers among chambers. As discussed at column 4, lines 18-20, *“robot 20 can insert and remove a wafer 16 or wafers from any one of the chambers according to a desired application”*. Based on this, the Examiner has submitted that *“it would have been obvious to one of ordinary level of skill in the art at the time the invention was made to move the wafer from the chemical vapor deposition chamber directly to an annealing chamber”*. Applicants respectfully disagree.

Henley makes it clear that the robot moves the wafers according to a desired application. However, Henley does not teach or suggest an application in which wafers are moved directly from a chemical vapor deposition chamber to an annealing chamber. Therefore Henley does not teach or suggest all claim limitations. It is well established that in order to establish a *prima facie* case of obviousness the prior art reference must teach or suggest all the claim limitations. There simply is not suggestion of the modification of Henley proposed by the Examiner. Accordingly, for at least this reason, the Examiner has failed to establish a *prima facie* case of obviousness. In particular, the Examiner has failed to show that the suggestion to modify Henley found in the prior art, and not based on Applicant’s disclosure.

Furthermore, as was stated in *In re Gordon*, 221 USPQ 1125, 1127 (Fed. Cir. 1984), *“The mere fact that the prior art could be so modified would not have made the modification obvious **unless the prior art suggested the desirability of the modification.**”* (emphasis added). Henley simply does not suggest the desirability of an apparatus including a robot to move wafers having metal layers deposited thereon from chemical vapor deposition chambers directly to one or more annealing chambers shortly after the metal layers have been deposited on the wafers in order to anneal the metal layers to

stabilize hardness of the metal layers prior to chemical mechanical polishing. Accordingly, for at least this second reason alone, the Examiner has failed to establish a *prima facie* case of obviousness. In particular, the Examiner has failed to show where Henley suggests the desirability of a robot to move wafers having metal layers deposited thereon from chemical vapor deposition chambers directly to one or more annealing chambers shortly after the metal layers have been deposited on the wafers prior to chemical mechanical polishing.

Accordingly, for at least one or more of these reasons, **claim 31** is believed to be allowable. **Claims 32-39** depend from claim 31, and are believed to be allowable therefor, as well as for the recitations set forth in each of these dependent claims.

As amended, independent **claim 40** recites a wafer processing apparatus comprising “*one or more annealing chambers, the one or more annealing chambers integrated with the wafer processing apparatus, the one or more annealing chambers to anneal wafers having metal layers thereon to stabilize hardness of the metal layers prior to chemical mechanical polishing; one or more chemical mechanical polishing platforms, the one or more chemical mechanical polishing platforms integrated with the wafer processing apparatus, the one or more chemical mechanical polishing platforms to polish the wafers including the metal layers; a robot to move the wafers having the metal layers deposited thereon from the one or more annealing chambers directly to the one or more chemical mechanical polishing platforms*”. Henley does not teach or suggest such a wafer processing apparatus.

Henley does not teach or suggest all of these claim limitations and does not teach or suggest the modification that is proposed by the Examiner. Furthermore, Henley does not teach or suggest the desirability of the modification that is proposed by the Examiner.

The discussion above is pertinent to these points. Accordingly, the Examiner has failed to establish a prima facie case of obviousness.

Accordingly, for at least one or more of these reasons, **claim 40** is believed to be allowable. **Claims 42-46** depend from claim 40, and are believed to be allowable therefor, as well as for the recitations set forth in each of these dependent claims.

As amended, independent **claim 47** recites a wafer processing apparatus comprising “*one or more chemical mechanical polishing platforms, the one or more chemical mechanical polishing platforms integrated with the wafer processing apparatus, the one or more chemical mechanical polishing platforms to polish wafers having metal layers thereon; one or more annealing chambers, the one or more annealing chambers integrated with the wafer processing apparatus, the one or more annealing chambers to anneal the wafers having the metal layers thereon to stabilize hardness of the metal layers after the wafers have been polished; a robot to move the wafers that have been polished from the one or more chemical mechanical polishing platforms directly to the one or more annealing chambers*”. Henley does not teach or suggest such a wafer processing apparatus.

Henley does not teach or suggest all of these claim limitations and does not teach or suggest the modification that is proposed by the Examiner. Furthermore, Henley does not teach or suggest the desirability of the modification that is proposed by the Examiner. The discussion above is pertinent to these points. Accordingly, the Examiner has failed to establish a prima facie case of obviousness.

Accordingly, for at least one or more of these reasons, **claim 47** is believed to be allowable. **Claims 48-51** depend from claim 47, and are believed to be allowable therefor, as well as for the recitations set forth in each of these dependent claims.

### **Conclusion**

In view of the foregoing, it is believed that all claims now pending patentably define the subject invention over the prior art of record and are in condition for allowance. Applicants respectfully request that the rejections be withdrawn and the claims be allowed at the earliest possible date.

### **Request For Telephone Interview**

The Examiner is invited to call Brent E. Vecchia at (303) 740-1980 if there remains any issue with allowance of the case.

### **Request For An Extension Of Time**

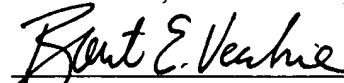
The Applicants respectfully petition for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17 for such an extension.

### **Charge Our Deposit Account**

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,  
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: February 15, 2006

  
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